HEATING ALL AROUND

CE

EN 442 ★ NORMA EUROPEA

water model
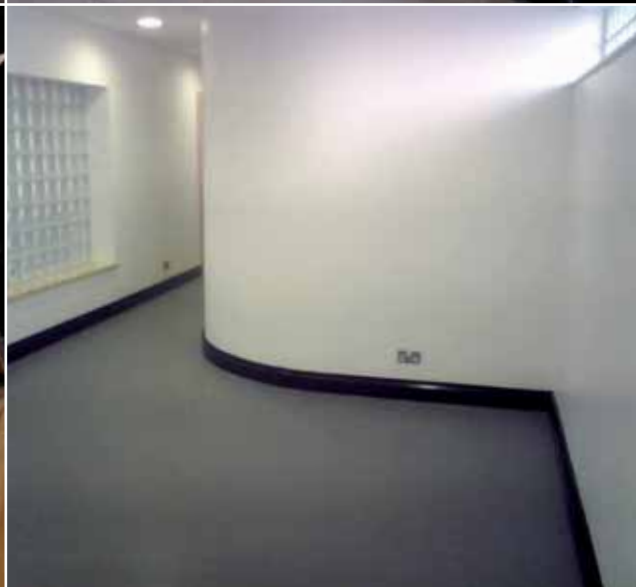
CE

electic model

thermodul
radiant skirting board heating systems **by hekos**

An enveloping warmth, a snug sensation of well being, feeling comfortable at home every day.

thermodul
radiant skirting board heating systems **by hekos**

The skirting board heating system

THERMODUL is a **healthy and comfortable** system because:

- it operates mainly by **radiation** (80-85%), the most natural and efficient heat diffusion system, which provides a high degree of comfort;
- *it does not collect microdust* and bacteria because the convective part is very compact;
- *it does not dry the air* and this promotes easy breathing;
- due to its specific position *it keeps the walls dry*, thereby avoiding the formation of mould and condensation;
- *heats uniformly* and avoids the problem of cold feet and hot head.

THERMODUL is a **simple and functional** system because:

- it works with any heating technology;
- *it is external to the wall* and therefore does not require any specific wall modifications for installation;
- it may be fully *inspected*.

THERMODUL allows remarkable **energy savings** because:

- it is able to reach the comfort point with a thermostat temperature 1-2 degrees less than radiators due to the uniform heat diffusion;
- it is able to *establish the temperature regulation quickly* due to the small amount of water circulating within the system.

THERMODUL is a **stylish** system because:

- it has a *streamlined design* and is inserted unobtrusively into any environment;
- it is *compact* and allows the maximum use of available space.
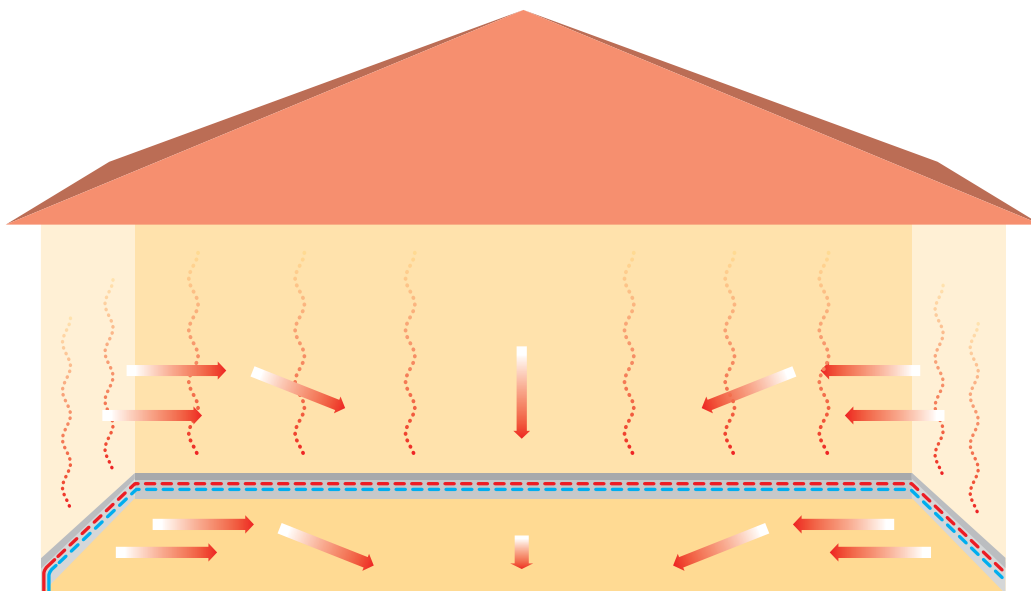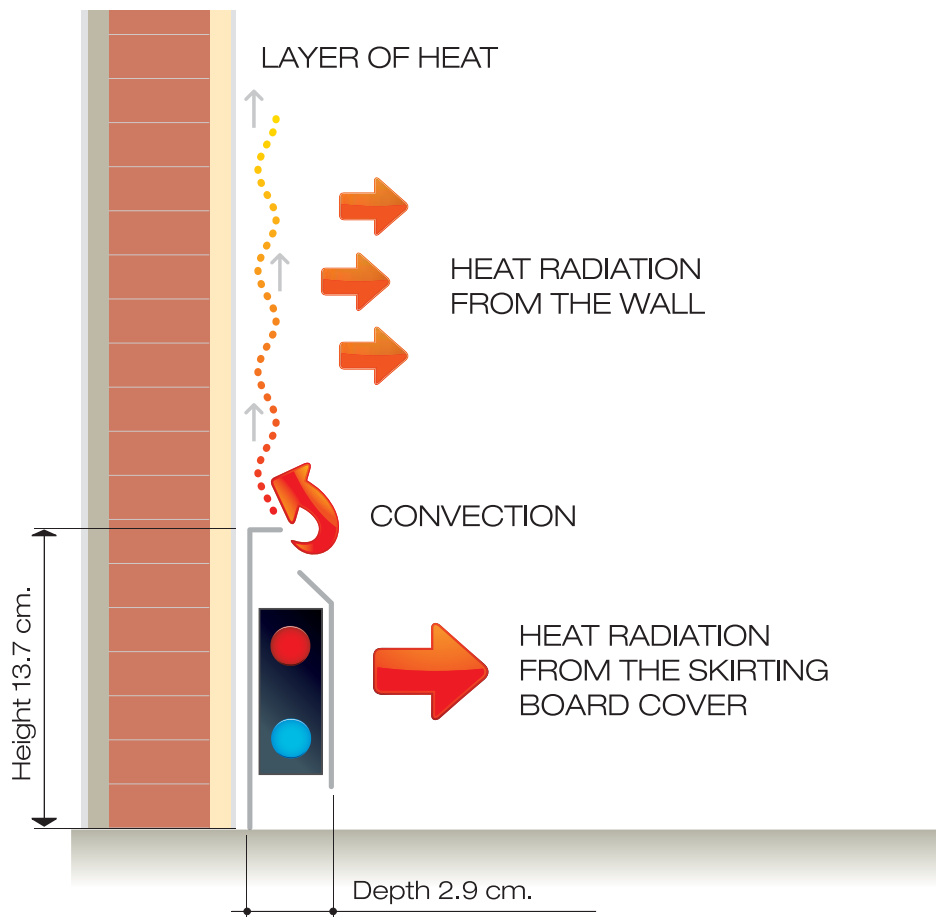
CE

EN 442
NORMA EUROPEA

Due to its versatility, the skirting board system is extremely flexible both in fields of application and typology of construction applications

- Residence
- Offices
- Businesses
- Schools
- Entertainment
- Hotels and restaurants
- Sporting facilities
- Churches
- Museums and showrooms

Technologies for application in construction

- New buildings
- Restoration and remodeling
- Ordinary and special maintenance
- Replacement of radiator bodies only
  (without modification or replacement of existing boiler system components or piping types)
- Incorporation into other radiant systems

LAYER OF HEAT

HEAT RADIATION
FROM THE WALL

CONVECTION

HEAT RADIATION
FROM THE SKIRTING
BOARD COVER

Height 13.7 cm.

Depth 2.9 cm.

THERMODUL operation

The design outlines the **THERMODUL** operation which is mainly based on radiation, promoting physical comfort and well being.

The convective part is low and slow and does not raise dust and bacteria, with marked benefits for environmental health.

thermodul

radiant skirting board heating systems **by hekos**

Thermodul System
Water model
(EN 442-1-2)

$C\epsilon$

Height	13.7 cm.
Depth	2.9 cm.

The **THERMODUL** system in the water version can operate with any thermal generator (gas boiler, oil boiler, thermal track, solar panels, heat pumps, etc.), allows diversifying the temperature by environment, can be planned in new buildings and is certainly ideal in restructuring given that it does not require specific wall work in order to be installed. Thus the radiators can be replaced or incorporated without specific modifications.

The system has a low thermal inertia and therefore becomes operative in a relatively short time.

This makes the system very flexible: it can be managed with simple on-off thermostat or "in continuous" with an external climate control unit complete with an external sensor that regulates the feed temperature upon the outside temperature.

Due to the low water content (0.29 l / mt) and the unique distribution of the heat system, we can reach a significant energy savings (30 - 40%).

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by hekos

Art. SL

Art. KA

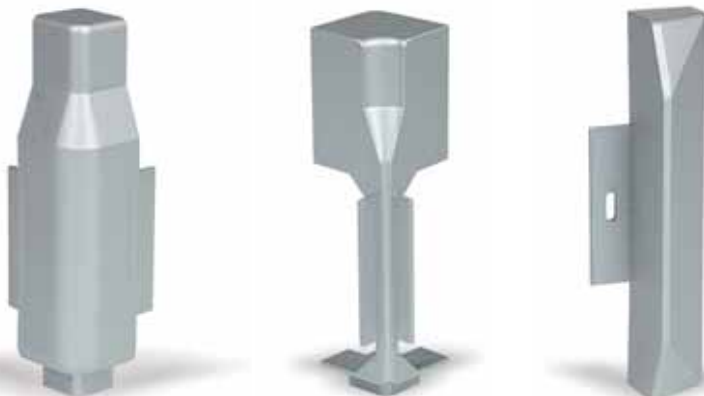Art. OC

Art. OBS

Art. OB

Art. OT

Art. PL

Art. OA

Art. OI

Art. OS

Art. CU

Components

Art. SL
Furnishing element in aluminium with frontal radiator and upper nib of the cover available in standard white RAL 9010, natural oxidized and dark bronze paint or, on request, in some wood colours and in other RAL colors

Art. KA
Heating core with supply and return copper piping external diameter 14.75 mm. thickness 0.6 mm, and in fins aluminium

Art. OT
Support rod in aluminium complete with screws and rawl plugs for attachment

Art. OI
Internal corner in PVC

Art. OA
External corner in PVC

Art. OS
End cap in PVC

Art. OB
180° return elbow in copper diam.14 thickness 1 mm

Art. OBS
180° return elbow in copper with venting valve diam.14 thickness 1 mm (for vertical double solution)

Art. OC
90° elbow pair in copper diam.14 thickness 1 mm

Art. PL
Profile in plastic

Art. CU
Duct in aluminium for the passage maximum of 3 cable on 2.5 mm^2 (in bars of 2.5 m)

Calculation method and system size

The recommended calculation procedure for the sizing of the THERMODUL heating system is indicated in the following points:

1) Distribution of the locations

The distribution of the locations for transmission and ventilation will be calculated according to the provisions of the UNI 7357/74 standard and successive updates.

2) Thermal yield of the skirting board

The thermal yields of the skirting board are noted using the tests performed by the Energy Department of the Milan Polytechnic. The characteristic equation of the heating body relative to the linear meter length of skirting board with heating core is:

$$q_o = Km \ x \quad t^n$$

q_o = thermal emission in watts per meter of skirting board with a heating core

K_m = 0.92 coefficient

t = difference between the average temperature of the water and the air in °C
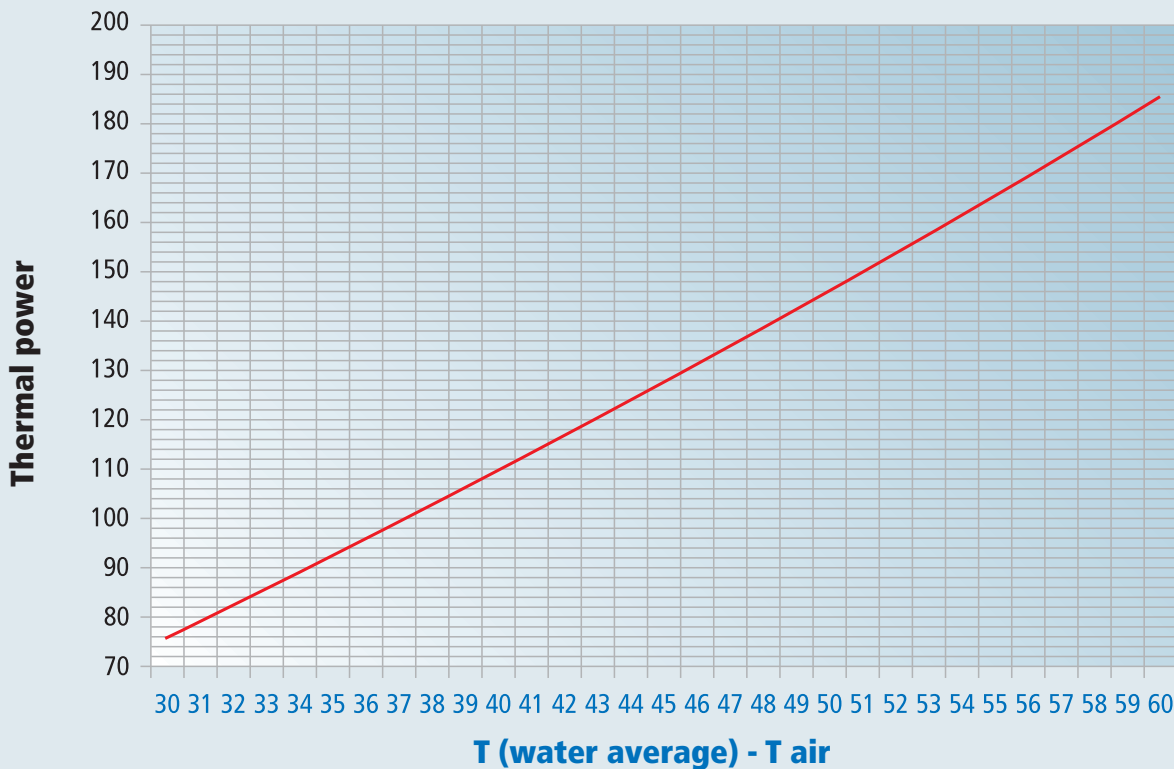
n = 1.296 coefficient

The table presented below summarizes the thermal emission per linear meter with respect to the variation of the difference in temperature between the water and the air.

THERMAL EMISSION OF THE ACTIVE SKIRTING BOARD AS A FUNCTION OF THE DIFFERENCE BETWEEN THE AVERAGE TEMPERATURE OF THE WATER AND THE AIR, ACCORDING TO STANDARD EN 442

T(°C)	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
q_o (W)	75,5	78,8	82,1	85,5	88,8	92,2	95,7	99,1	102,6	106,1	109,7	113,2	116,8	120,4	124,1

T(°C)	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
q_o (W)	127,7	131,4	135,2	138,9	142,7	146,4	150,2	154,1	157,9	161,8	165,7	169,6	173,5	177,5	181,5	185,5

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Thermal output in watts according to EN 442 standard

Thermal power (y-axis): 70 to 200

T (water average) - T air (x-axis): 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60

3) Length of the skirting board to be laid (active part with heater core)

The theoretical length to be laid is obtained by the ratio between the power determined at point 1) and the thermal emission of the skirting board.

Example: power required $q = 1230$ W
             thermal emission (t = 50°C) $q_0 = 146.4$ W/m
             length to be installed $L = q/q_0 = 8.4$ m

4) Placement of the skirting board

The active part of the skirting board will be placed in preliminary fashion on the external wall and then on the internal wall. By this means, the radiant surface of the skirting board compensates the coldest radiant surface of the wall. Moreover the weak convective current of hot air coming out of the skirting board contrasts with the cold air which would tend to descend along the external wall. A uniform temperature is thus obtained from floor to ceiling.
In the case where the length of the wall facing the outside is insufficient to contain the required length of the heating skirting board, active elements will also be placed along the inside walls, distributing them on all sides.
The specified system flexibility is such that the skirting board may also be placed:
*   on furnishing elements such as bases of kitchen furniture, wall cabinets, etc.
*   in double height for large spaces with high dispersions (e.g. gymnasiums, restaurants,...)
*   vertically with single and double height.

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Thermodul System water model

For all specific applications the Hekos technical office will supply targeted and customized solutions.
In the placement of the skirting board, bear in mind that:
- the active elements are provided in the standard length of 2.5 mt.
- the elements can be cut to size on site
- they can be connected in series, bearing in mind that 10 cm is required for connections.
- for walls with linear length greater than 8 m, the installation of an expansion joint (e.g. stainless steel expansion joint,...) is recommended
- 15-20 cm. of bare copper pipe without fins must be provided at corners in both directions (appropriate bends of 90° are available)
- no specific bleeding of the system is required (the bleeding operation performed at the beginning is sufficient)
- the maximum length of a single ring with a skirting board system should not be greater than 40 meters (supply and return; however the active part of the skirting board of an individual ring should not be greater than 20 meters) in order to guarantee the yield listed in the table. Whenever there are rings with lengths greater than 20 m, dou bling up is recommended, if possible, or a lower yield must be considered given a higher thermal difference.
- the skirting board will preferably be connected to the system so that the upper tube is the supply.
- Maximum working pressure 3 bar

5) Hydraulic connection

It is possible to connect the heating elements to the system with two traditional pipes, the most effective and economic method foresees the installation of the valved manifold system, from which the supply piping leaves and arrives, heating the skirting board of the individual rooms.

6) Calculation of the capacity

Note: from the thermal power installed in the room, it is possible to deduce the supply capacity of the circuit by fixing the thermal difference between the supply and return.
It is advisable not to adopt high thermal differences between the supply and return limiting it to at most 12 °C.

Example $\quad q = 1230$ W
$\quad t_a = 10$ °C

$$Q = \frac{1230}{4186 \times 10} = 0.0294 \text{ Kg/sec equal to } 106 \text{ Kg/hr}$$

Q = mass capacity in Kg/hr

7) Calculation of the speed

Note: it is possible to calculate the speed of the water in the piping from the capacity. For this purpose it can be considered that 1 kg corresponds to 1 litre of water. Because the internal diameter of the core heating pipe has a diameter of 13.5 mm and therefore a passage area (A) equal to 143 mm^2, the speed is determined by the expression:
$v = Q/ A \times 3.6$ m/sec

Example $\quad v = 106/143 \times 3.6 = 0.21$ m/sec

Because the water speed influences the skirting board yield, it is good that the speed should not be less than 0.15 m/sec. With a speed of 0.15 m/sec a minimum capacity of 80 kg/hr is determined.

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In the case where the circuit capacity, calculated according to the procedure indicated in point 6), is less than 80 kg/hr it is advisable to adopt the latter value and possibly review the capacity of the skirting board that is to be laid. An example clarifies the procedure to adopt:

Dispersion q = 590 W
Supply temperature = 75 °C
Return temperature = 65 °C
Average water temperature =70 °C
Thermal emission q_o= 146.4 W/m
Active length calculated = q/q_o = 590/146.4 = 4.0 m
Capacity Q = (590/ 4186 x 10) x 3600 = 50.7 l/h

Because the capacity is less than 80 l/h, this latter value is adopted for the circuit capacity, allowing for the recalculation of parameters which are modified by the assumptions made.

With 80 l/hr the thermal difference of the water is modified

New t_a* = (50.7/80) x 10 = 6.3 °C
New T_M*   =   75 ° - 6.3 °/2 = 71.9 °C
New   t*   = 71.9 °C 20 = 51.9 °C
New yield of the skirting board q_o*= 153.7 W/m
New active length of the skirting board L* = 590/153.7 = 3.84 m
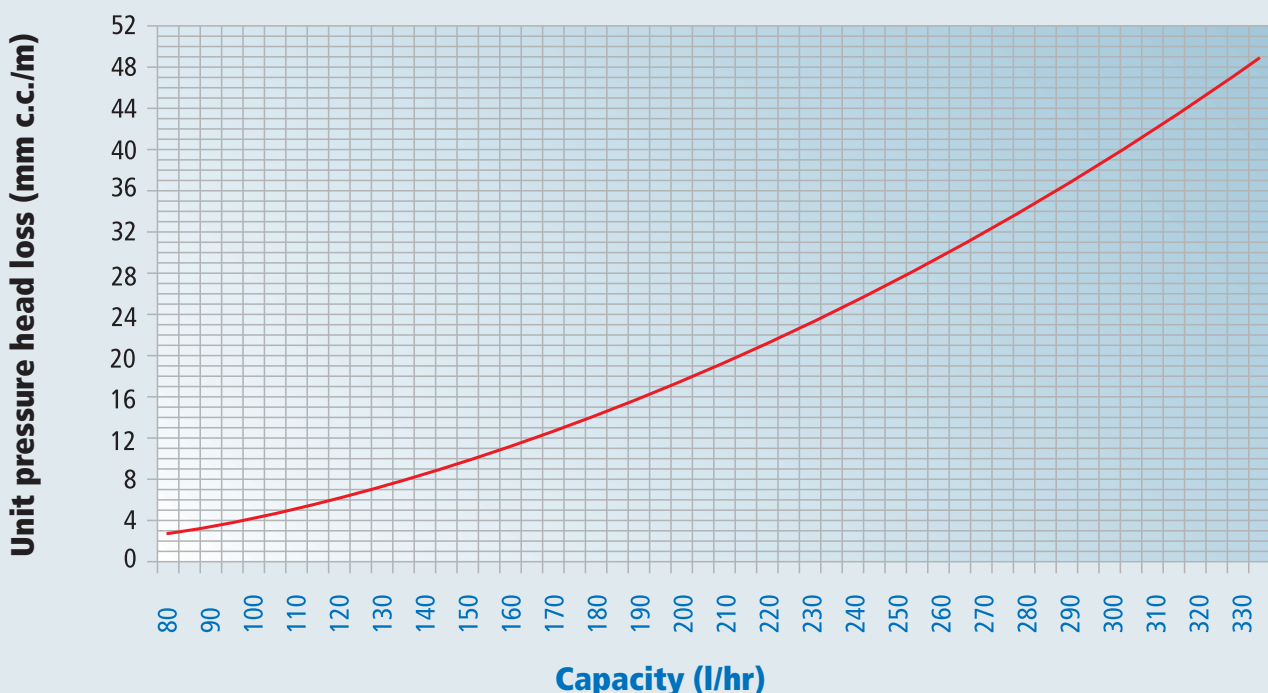
8) Pressure head loss

The pressure head loss is calculated with the customary formulae and tables in use for thermal systems:
The heating core tube is in copper with internal diameter of 13.5 mm. The connection piping for hooking up the heating core can be in copper or multilayer. The connection of the skirting board to the manifold can be performed with piping of copper, mild steel, multilayer, cross-linked polyethylene, etc. The continuous pressure head loss per meter length is determined with the hydraulic formulae or with tables presented in the manuals; By way of example we present a calculation formula that is adapted for low rugosity piping with water at 70°C and for speeds from 0.15 to 0.7 m/sec applied for the piping which forms the active core of the skirting board.
y_u = 4.38 x 10^{-4} x Q^2 with y_u in mm c.a./ m and Q in l/hr

Pressure head loss for water at 70° C

Unit pressure head loss (mm c.c./m) vs Capacity (l/hr)

Thermodul System water model

The localized pressure head loss can be calculated with the usual formulae and tables either with the equivalent length method or by the method of localized loss coefficients.

9) Heat balancing

The heat balancing of the ring is performed with the same methods as those with which the system's radiators fed from the manifold are balanced. The heat balancing in general will be performed with the holders mounted on the manifolds.

10) Temperature regulation

Temperature regulation in the individual locations may be obtained with:

- thermostat valve with remote control. The controllable thermostat valve is mounted on the supply piping which feeds the skirting board and the remote sensor mounted directly in the environment
- thermoelectric valve mounted on the manifold activated by the timing, or ambient thermostat.

All the following regulation solutions are also possible:
- climate control with supply temperature based upon the outside temperature
- environment with supply temperature regulation

The climate control system which varies the supply temperature directly in the boiler is provided with coupling to the condensation boiler. By sizing the heating elements with supply temperature under the design conditions equal to 65-70°C, it is possible to deliver water at a lower temperature when outside conditions so permit. In such a mode it is possible to benefit from the condensation for a significant period of the heating season with reduction of fuel consumption.

11) Schematic diagrams

Hereunder some possible schemes are proposed for hooking up the skirting board in autonomous systems with wall boiler. Other solutions are obviously possible which foresee the use of premounted modules with manifold, pumps, regulators off-the-shelf.

HEAT GENERATOR WITH CLIMATE CONTROL REGULATION OF THE DELIVERY TEMPERATURE WITH A CIRCULATOR WHICH HAS SUFFICIENT CAPACITY AND TOTAL DELIVERY PRESSARE FOR THE SYSTEM
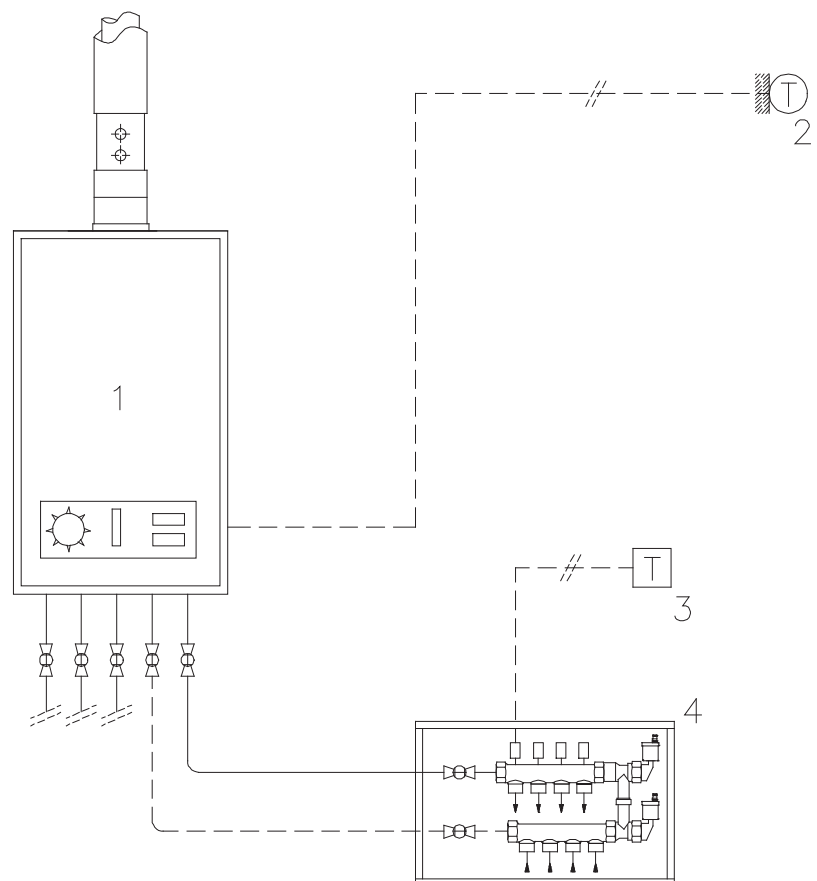

1 – HEAT GENERATOR
2 – EXTERNAL TEMPERATURE PROBE
3 – ENVIRONMENTAL TEMPERATURE REGULATOR
4 – MANIFOLDS WITH DIFFERENTIAL BY-PASS

HEAT GENERATOR WITH CLIMATE CONTROL REGULATION OF THE DELIVERY TEMPERATURE WITH A
CIRCULATOR WHICH HAS SUFFICIENT CAPACITY AND TOTAL DELIVERY PRESSARE FOR THE SYSTEM

1 – HEAT GENERATOR
2 – EXTERNAL TEMPERATURE PROBE
3 – ENVIRONMENTAL TEMPERATURE REGULATOR
4 – MANIFOLDS WITH DIFFERENTIAL BY-PASS
5 – HYDRAULIC SEPARATOR
6 – AUXILIARY CIRCULATOR
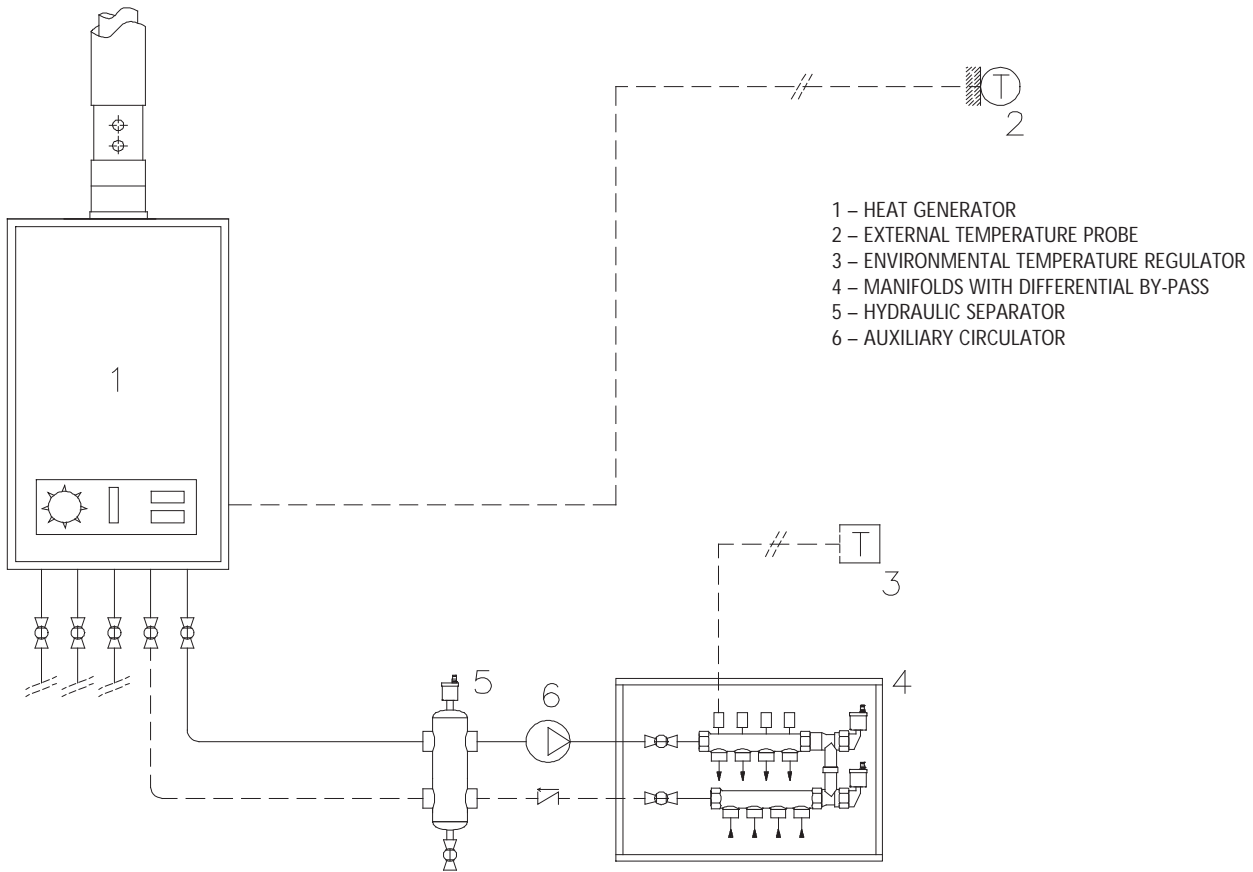
3rd case

HEAT GENERATOR WITH DELIVERY TEMPERATURE CONTROL AT FIXED POINT CLIMATE CONTROL
REGULATION WITH 3 – WAY VALVE AND INDEPENDENT REGULATOR, CIRCULATOR WHICH HAS INADE-
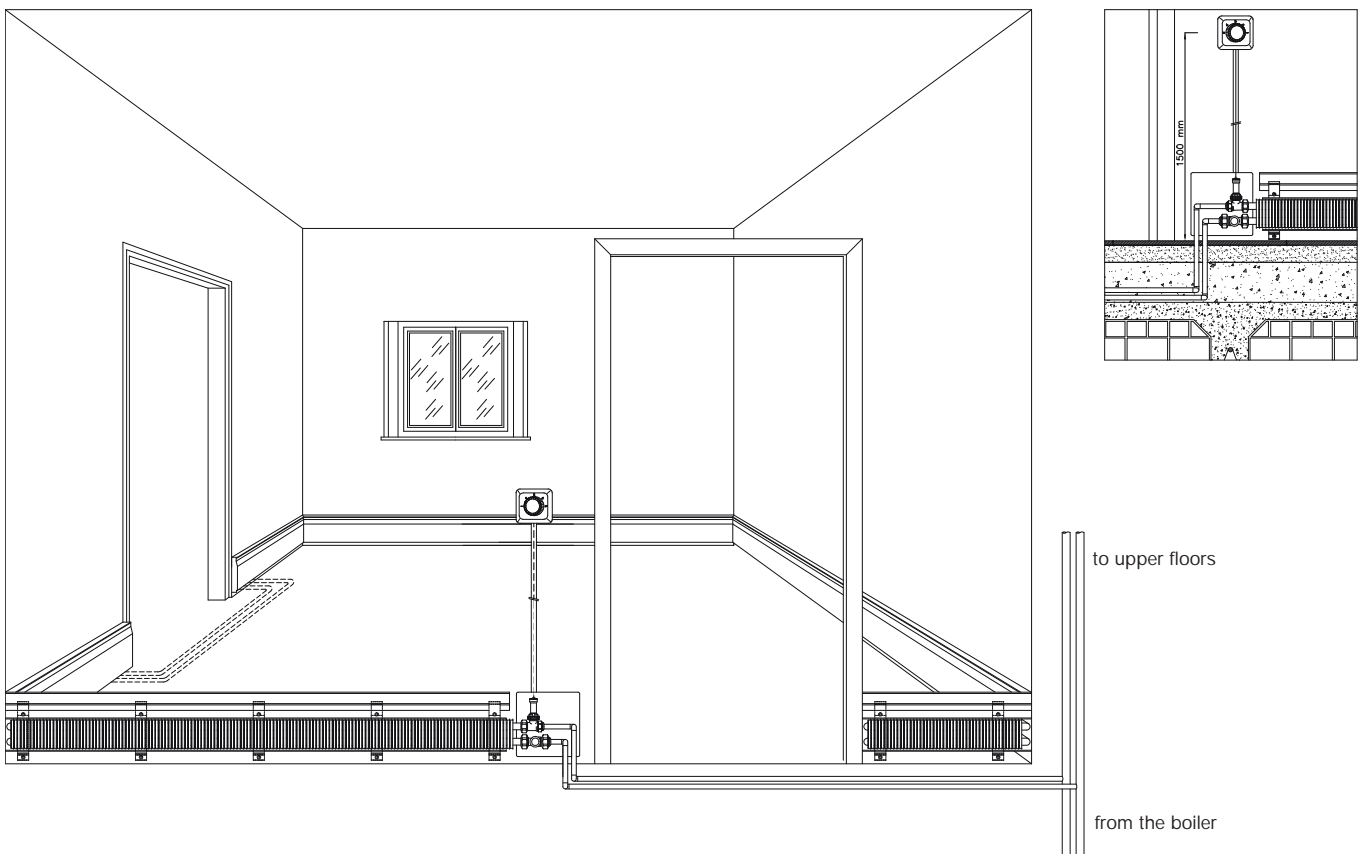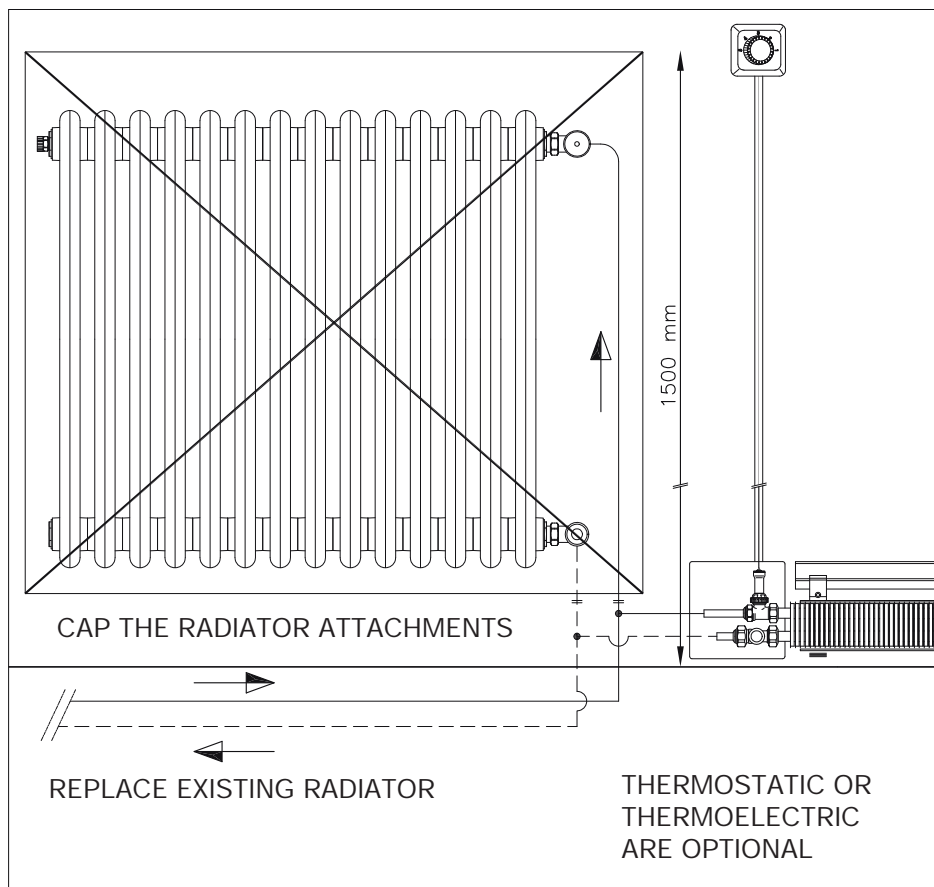QUATE CAPACITY AND TOTAL DELIVERY PRESSARE FOR THE SYSTEM

1 – HEAT GENERATOR
2 – EXTERNAL TEMPERATURE PROBE
3 – ENVIRONMENTAL TEMPERATURE REGULATOR
4 – MANIFOLDS WITH DIFFERENTIAL BY-PASS
5 – HYDRAULIC SEPARATOR
6 – MIXER VALVE
7 – AUXILIARY CIRCUIT
8 – TEMPERATURE REGULATOR
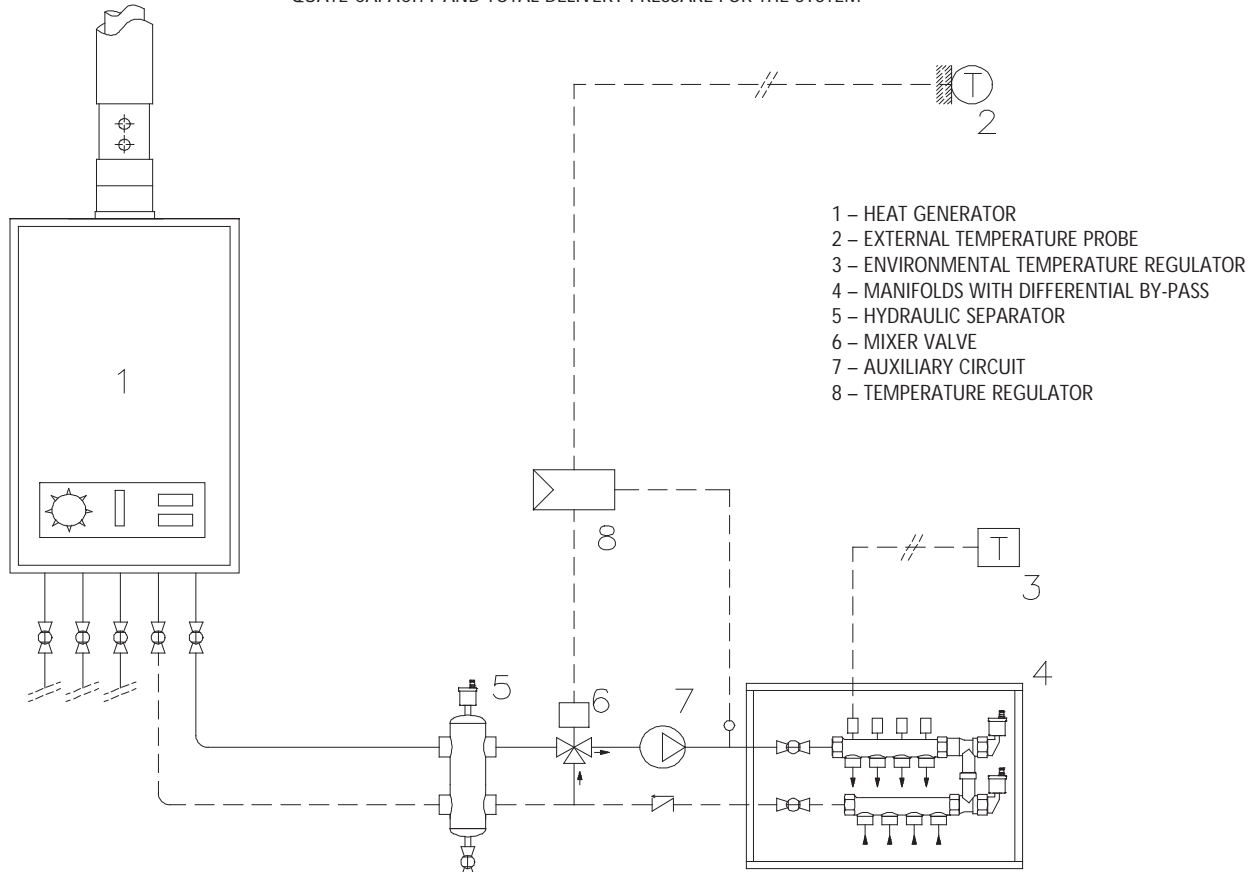
Thermodul System water model

Room with temperature regulation via electrical zone thermostat and valve installed on the distribution manifold

from the boiler

for the other rooms
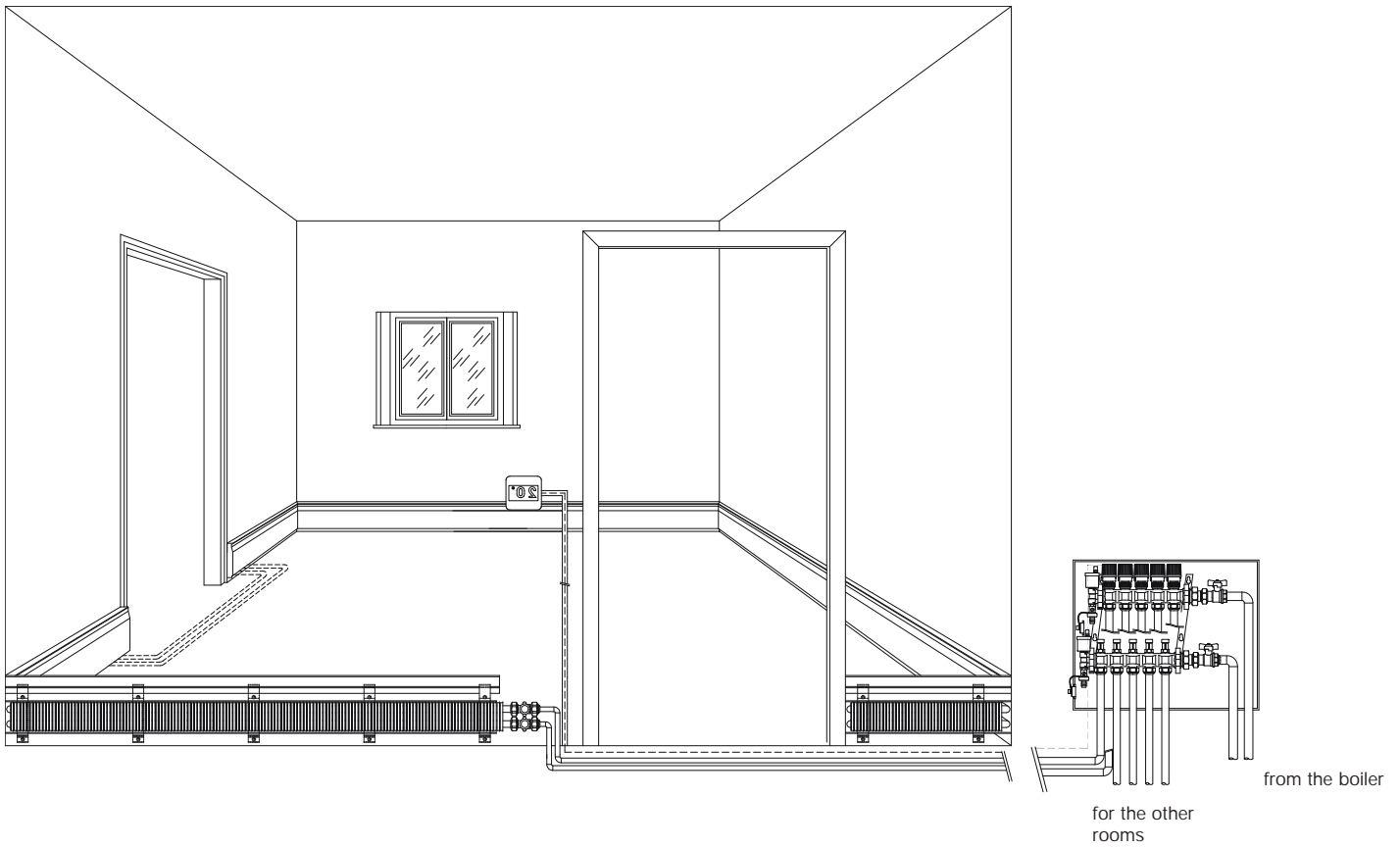
Room with temperature regulation using mechanical thermostat or thermoelectric valve with remote control and normal twin tube distribution

to upper floors

from the boiler

thermodul by hekos

Replacement of existing radiator with **THERMODUL system**

1500 mm

CAP THE RADIATOR ATTACHMENTS

REPLACE EXISTING RADIATOR

THERMOSTATIC OR
THERMOELECTRIC
ARE OPTIONAL

Incorporation with existing radiators to improve yield and thermal comfort

1500 mm

INCORPORATION OF
EXISTING RADIATOR

THERMOSTATIC OR
THERMOELECTRIC
ARE OPTIONAL

thermodul **17**
by hekos
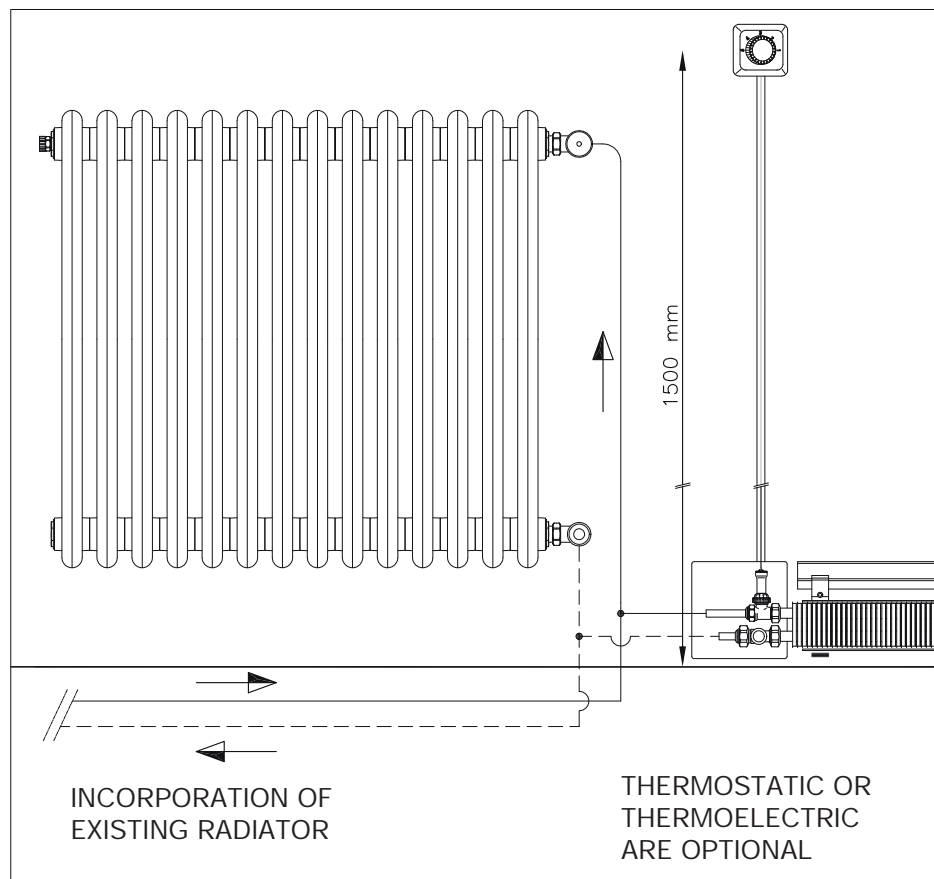
Heat distribution scheme determined in test room of the Milan Polytechnic in a test for determining of thermal performance of THERMODUL as a function of the EN 442-1-2 standard.

POLITECNICO DI MILANO - DIPARTIMENTO DI ENERGETICA
Laboratorio Misure Ricerche Termotecniche M.R.T.
Laboratorio di riferimento conforme a EN 442/ Laboratoire de réference en conformité avec EN 442/
Reference Laboratory according EN 442/ Referenz Prüflaboratorien nach EN 442.

Accreditamento n° / Rapport de controle No / Assessment report No / Beurteilungsbericht : N° 104
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Indirizzo/adresse/address/antragsteller: Piazza Leonardo da Vinci, 32   20133 Milano - tel. 02 2399 3834   fax 02 2399 3940
international phone +39 2 2399 3834   fax +39 2 2399 3940   email : mrt@clausius.energ.polimi.it

Test n°: 00374
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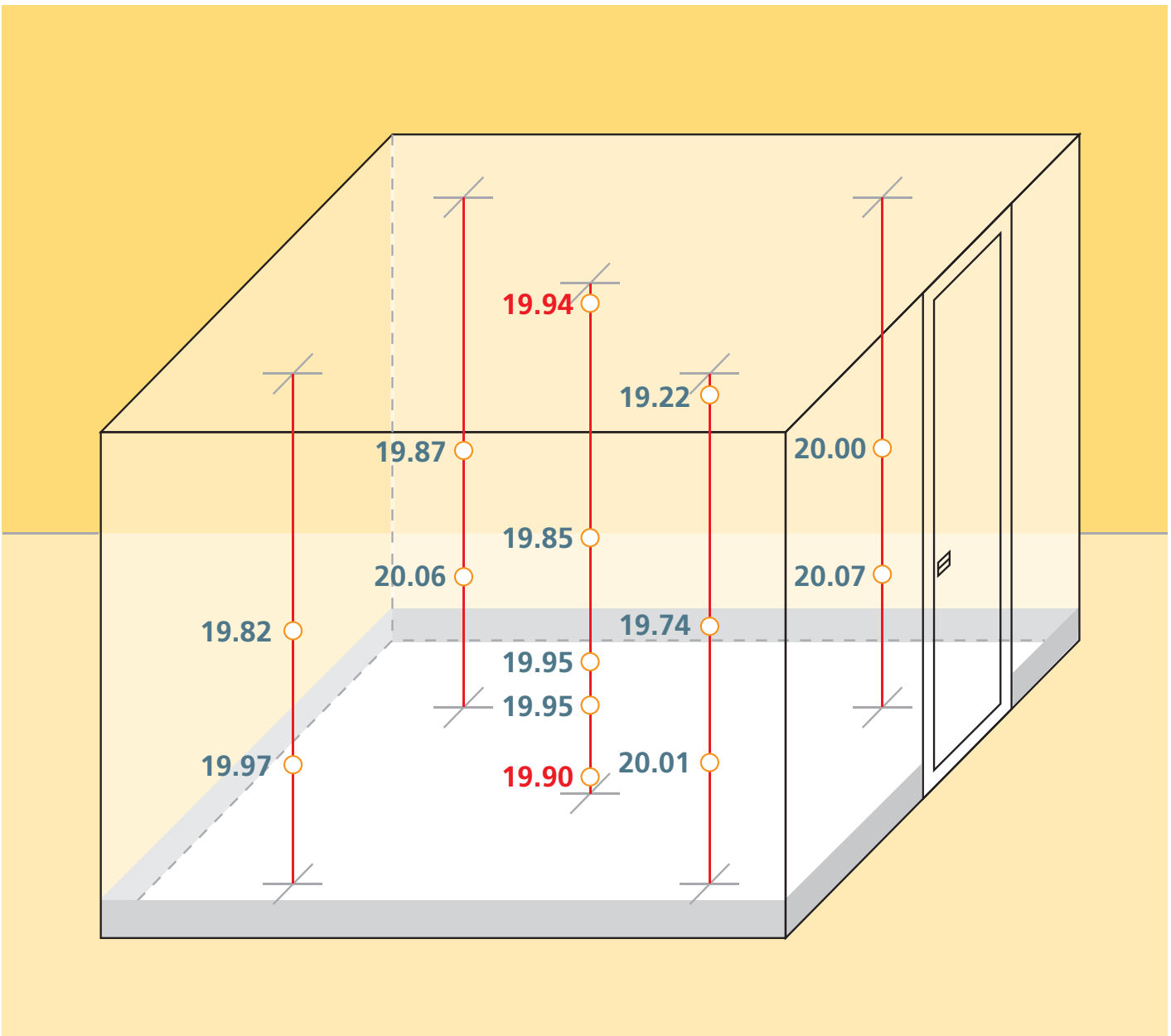
The diagram presents the temperature measured at various points in the test room during a test and demonstrates that with **THERMODUL** there is effectively a uniform distribution of heat from floor to ceiling.

Calculation example

After defining the **THERMODUL** active linear meters (art. KA) according to the criteria specified in the calculation method chapter, the respective design proceeds according in this manner:

Art. OC

Art. OB

Art. OBS

Art. SL

Art. KA

Art. OA

Art. OI

Art. OS

HEATING CORE
art. **KA** in the amount defined by the calculation

FURNISHING ELEMENT
art. **SL** in the amount necessary to cover the heating core - (art. **KA**) and respective connection piping and possibly so as to cover the entire perimeter of the room for aesthetic purposes

INTERNAL CORNER - art. OI,
EXTERNAL CORNER - art. OA,
END CAP - art. OS
from calculation based on the geometry of the site.

FINAL ELBOW 180°
art. **OB** to close each circuit

COPPER ELBOW 90°
art. **OC** connection elbows 90°

COLLECTOR

KA 2.0
KA 1.0
KA 2.5
④ 870 W
KA 2.0   KA 0.5
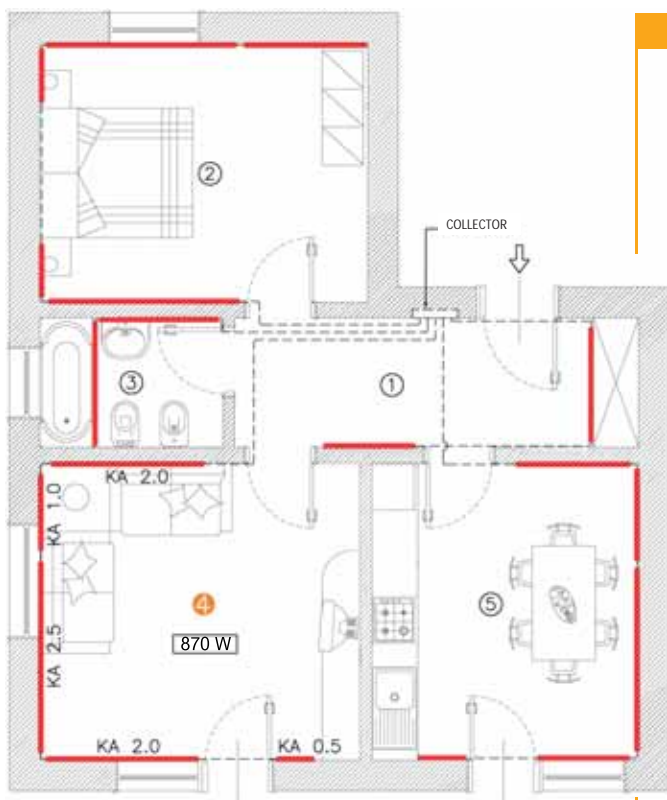
Example of calculation for the no. 4 location

Calculation data

Thermal power for transmission and ventilation = 870 W
Delivery temperature = 65°C
Return temperature = 55°C
Average water temperature = 60°C
Ambient temperature = 20°C

The skirting board performance and the design is determined using the preceding data (T = 40°C)

Thermal emission of the skirting board heater = 109,7 W/m
Active lenght of the required skirting board heater = 870/109,7 = 7,93 meters
Installed length = 8 meters
Section lenght for hook-up (to floor and to skirting board heater) = 7,5 meters
Required capacity = (870 x 0,86)/10 = 74,82 liters/hr
Unit pressure head loss of skirting board heater piping = 10daPa (mm H2O)
Unit pressure head loss connection piping (copper ø 14x1) = 16 daPa (mm H2O)
Total pressure head loss active skirting board = 10 x (2 x 8) = 160 daPa (mm H2O)
Pressure head loss connection piping = 16 x (2 x 7,5) = 240 daPa (mm H2O)
Total pressure head loss of the circuit = 160 + 240 = 400 daPa (mm H2O)

Preliminary layout phases and system mounting.

THERMODUL system information in two separate phases:

1st phase

Preliminary layout, to execute the rough-in phase consists of:
bringing the supply and return piping into the various rooms, which should leave the wall at a height h 3.5 - 7 cm from the floor and already be bent parallel to the wall itself to permit the subsequent coupling to the **THERMODUL** heating cores.

Plan for possible passage beneath the door sill with multilayer piping, pre-insulated copper piping, etc.

50 mm   70 mm   35 mm
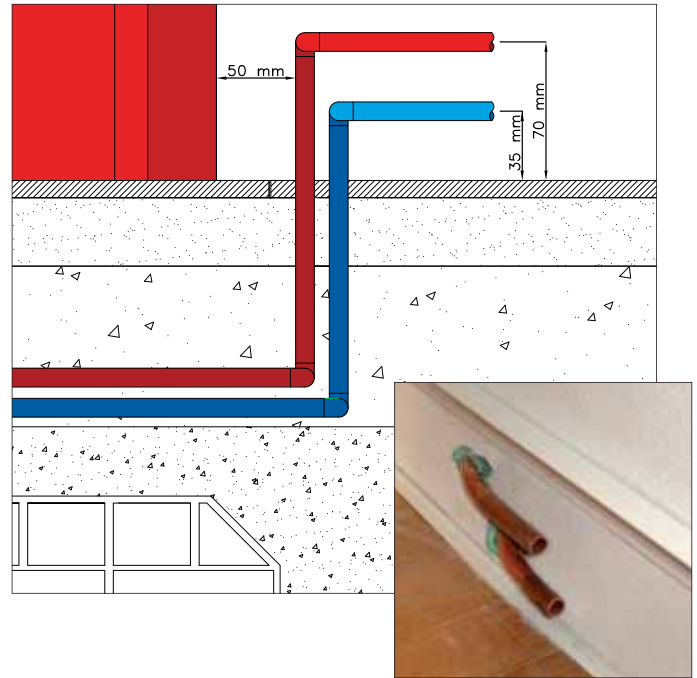
2nd phase

Installation phase of the **THERMODUL system** for finished internal work

»

Install the internal corners, external corners and end cap sections. Support the rod on the wall, mark, drill and fasten the rod and insert the upper nib of the cover into the appropriate seat. It is recommended mounting a rod every 50-60 cm.
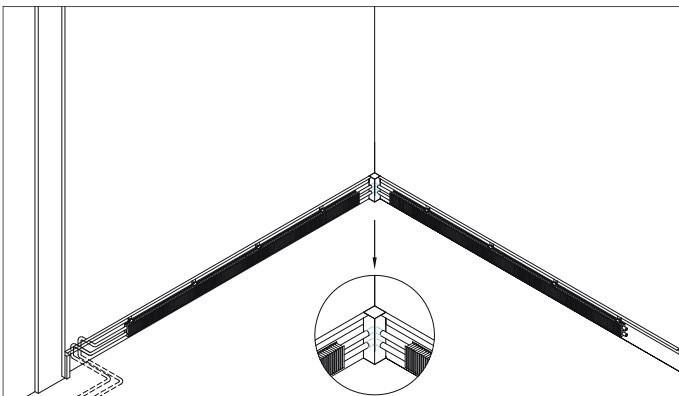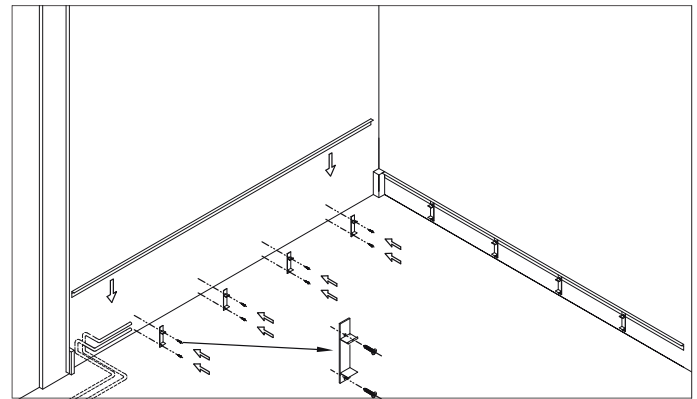
The heating cores are cut and inserted into position with the length indicated in the design and are connected to pipes in brazed copper or with press-fit connections in copper. At the corners, some 13-15 cm of bare copper tube without fins must be allowed.
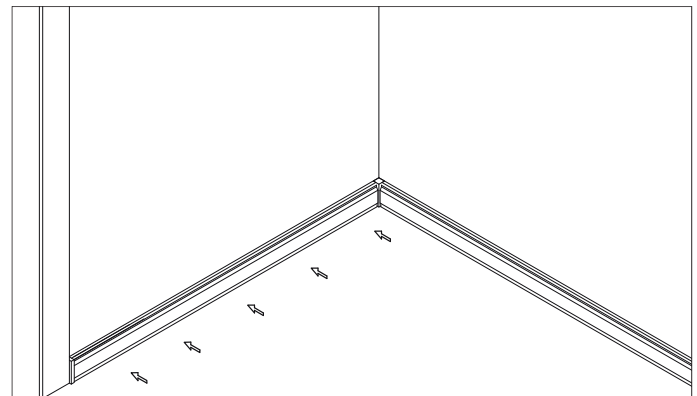
After the sealing test, cut and measure the front radiator panel; it is hooked to the upper part of the rod and is fastened to the lower part by quick hook and screws.

Specification testing

thermodul
radiant skirting board heating systems **by hekos**

Furnishing element in standard painted aluminium, composed of the front radiator panel and upper cover nib, support rods and sections in PVC.

Art.   SL   mt._____x   €_____

Heating core composed of supply and return piping in copper diam. 14.75 mm and aluminium fins.

Art.   KA   mt._____x   € _____

Internal corner in PVC for furnishing element

Art.   OI   pz._____x   € _____

External corner in PVC for furnishing element

Art.   OA   pz._____x   € _____

End cap in PVC for furnishing element

Art.   OS   pz._____x   € _____

Final 180° small elbow diam. 14 mm. for the delivery and return connection

Art.   OB   pz._____x   € _____

180° return elbow in copper with venting valve diam.14 thickness 1 mm
(for vertical double solution)

Art.   OBS   pz._____x   € _____

90° Connection elbow in copper diam. 14 mm.

Art.   OC   cop._____x   € _____

Duct in aluminium for the passage maximum of 3 cable on 2.5 mm² (in bars of 2.5 m)

Art.   CU   pz._____x   € _____

Thermodul System
Electrical model
(system according to EN 61000-3-3, 61000-3-2, 55014)

CE

| Height | 13.7 cm. |
| Depth | 2.9 cm. |

THERMODUL in the electrical version is a solution applicable in all those cases where, due to space or technical problems (for example the impossibility of installing a thermal generator) or due to the infrequent use of the property (e.g. holiday home), it is not appropriate to install a boiler.

Electrical **THERMODUL** is simple and quick to install. It requires a small initial investment in comparison to a traditional system (no boiler is required, distribution piping, manifolds, …). No wall work is needed.

The system is dimensioned by calculating the necessary resistances based on its power and length (described below) with regard to the available wall length and the thermal requirements to be satisfied.

It is verified that the contactor power is sufficient to cover the system absorption given the sum of the powers of the resistors installed, and it may be boosted or the typical priority switch system for the heating system may be adopted.

Installation is fast since the resistors should be connected in series, as in the diagram below, connected to a terminal and regulated by a thermostat or chrono-thermostats. If there are difficulties in running cables, a wireless solution is available using radio frequencies, available also in a home automation version to manage the system in remote.

THERMODUL electric model is especially convenient when combined with solar panels.

thermodul
by hekos

Components

Art. SL

Furnishing element in aluminium with frontal radiator and upper nib of the cover available in standard white RAL 9010, natural oxidised and dark bronze paint or, on request, in some wood paints and in other RAL colors

Art. NE-A

Heating core composed of aluminium containing 400 W armoured resistor - 2000 mm lenght

Art. NE-B

Heating core composed of aluminium containing 300 W armoured resistor - 1500 mm lenght

Art. NE-C

Heating core composed of aluminium containing 200 W armoured resistor - 1000 mm lenght

Art. NE-D

Heating core composed of aluminium containing 140 W armoured resistor - 500 mm lenght

Art. OE

Support rod in aluminium complete with screws and rawl plugs for attachments

Art. OI

Internal corner in PVC

Art. OA

External corner in PVC

Art. OS

End cap in PVC

Art. CU

Duct in aluminium for the passage maximum of 3 cable on 2.5 mm^2 (in bars of 2.5 m)

Art. SL

Art. OE

Art. NE-A
Art. NE-B
Art. NE-C
Art. NE-D

Art. OA

Art. OI

Art. OS

Art. CU

Electrical connection example

PHASE
NEUTRAL
EARTH

thermodul **23**
by hekos

Specification testing

thermodul
radiant skirting board heating systems **by hekos**
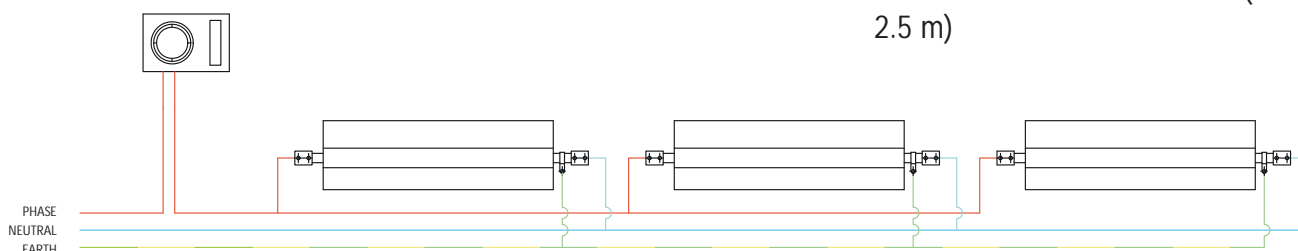
Thermodul System electrical model

Furnishing element in standard paint aluminium, composed of frontal radiator panel and upper covering nib, support rod

Art.   SL   mt._____x   €_____

Heating core composed of aluminium containing 400 W armoured resistor - 2000 mm lenght

Art.   NE-A   pz._____x   €_____

Heating core composed of aluminium containing 300 W armoured resistor - 1500 mm lenght

Art.   NE-B   pz._____x   €_____

Heating core composed of aluminium containing 200 W armoured resistor - 1000 mm lenght

Art.   NE-C   pz._____x   €_____

Heating core composed of aluminium containing 140 W armoured resistor - 500 mm lenght

Art.   NE-D   pz._____x   €_____

Internal corner in PVC for furnishing element

Art.   OI   pz._____x   €_____

External corner in PVC for furnishing element

Art.   OA   pz._____x   €_____

Terminal cap in PVC for furnishing element

Art.   OS   pz._____x   €_____

Duct in aluminium for the passage maximum of 3 cable on 2.5 mm^2 (in bars of 2.5 m)

Art.   CU   pz._____x   € _____

Thermodul System electrical model
Dual-mode model

CE

| Height | 13.7 cm. |
| Depth | 2.9 cm. |

This model includes water and electrical solution in a single system.
Operating with electricity or water boiler you can have a great autonomy (eg. centralized heating systems with fixed hours of operation, between seasons, boiler malfunction) with the possibility to use different energy sources.

The dual-mode **THERMODUL** is dimensioned following the methods specified in the preceding chapters for the water model and the electrical model respectively and is obtained by inserting the resistor directly into the hole located in the heating core (art. ka) between the copper pipes.

In this case take care during the installation to cut the heating core as a function of the length of the resistor.

The operation of the water system excludes the electrical one and vice-versa.

Horizontal double strip

Height	24.7 cm.
Depth	2.9 cm.

An ideal solution to satisfy larger thermal needs, for example, in churches, gyms, schools or in those environments in which the wall space is not sufficient to satisfy the heating needs with the standard traditional solution. It is advised, where possible, to separately feed the two strips.

This solution can be realized both in the water or electric version.

Design of system realized in the Vigonza gymnasium (PD)

System realized in gymnasium to replace the heated air ventilation system. The system consists of 4 horizontal double strips installed at various heights.
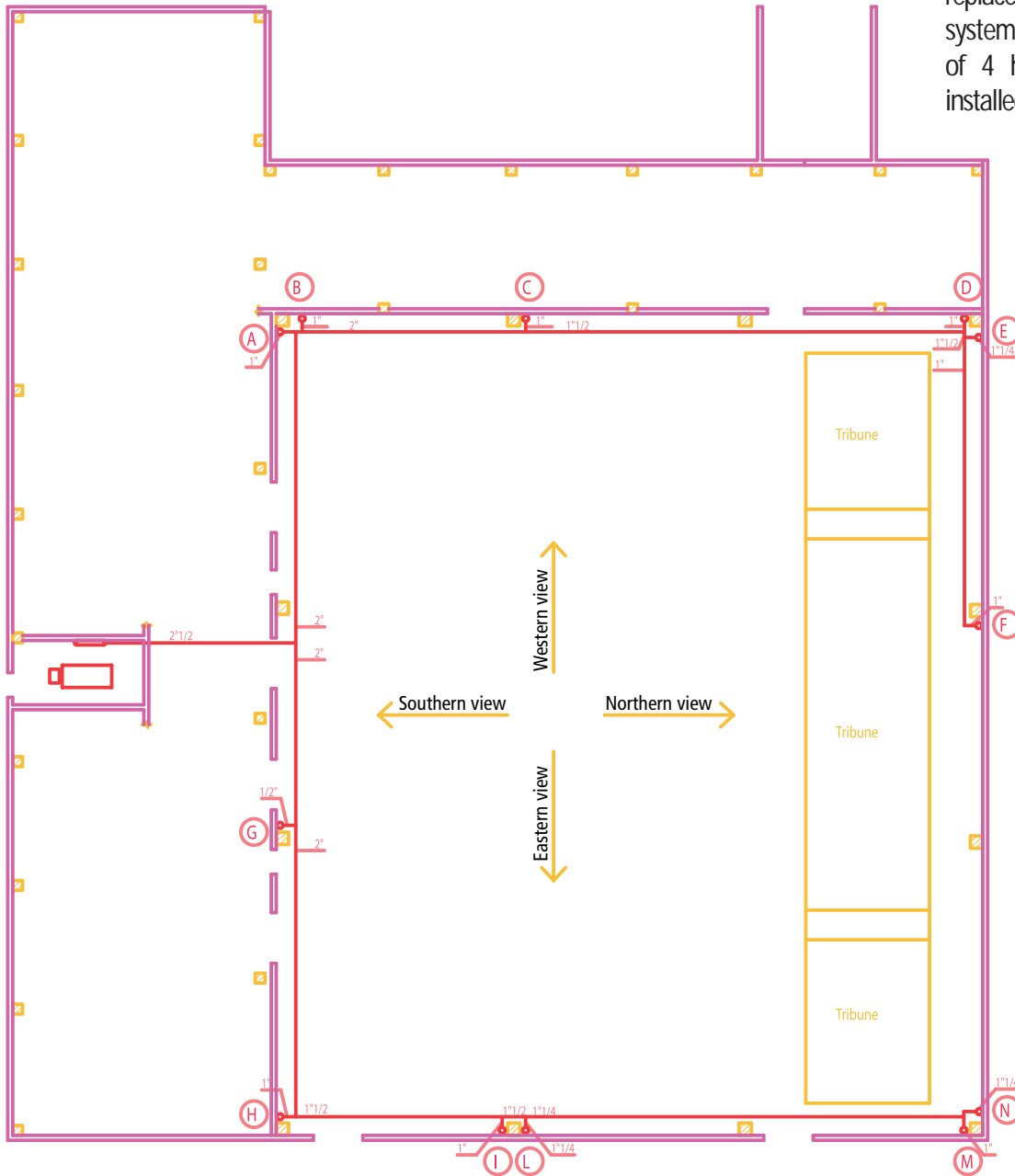
A
B
C
D
E
F
G
H
I L
M
N

1"
2"
1"
1"1/2
1"
1"1/2
1"1/4
1"
2"1/2
2"
2"
1/2"
2"
Tribune
Tribune
Tribune
Western view
Southern view
Northern view
Eastern view
1"
1"1/2
1"1/2 1"1/4
1" 1"1/4
1"1/4
1"

Vertical double strip

Height	variable
Depth	2.9 cm.
Width	24.7 cm.

An elegant solution with great thermal performances, ideal for bathrooms and kitchens Its size allows a good aesthetic integration as it fits easily in correspondence columns, or to the side door.
It can be adopted as a solution to feed the system from above or to cross door thus avoiding unnecessary brick work. Where needed, the solution can include towel rails.

This solution can be realized both in the water or electric version.

Two faring solution

Height	13.7 cm.
Depth	6.0 cm.

The coupling of the system fixed to the floor makes it ideal for heating environments with very large windows or exposed stone, etc . . .

The thermal output is doubled because of the use of two strips with respect to the single strip of the standard solution. If the electrical version is adopted the solution can include ducted cable
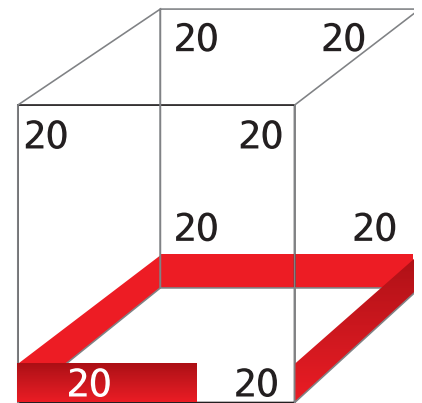
It's suggested to install this system at least 2 cm from the wall.
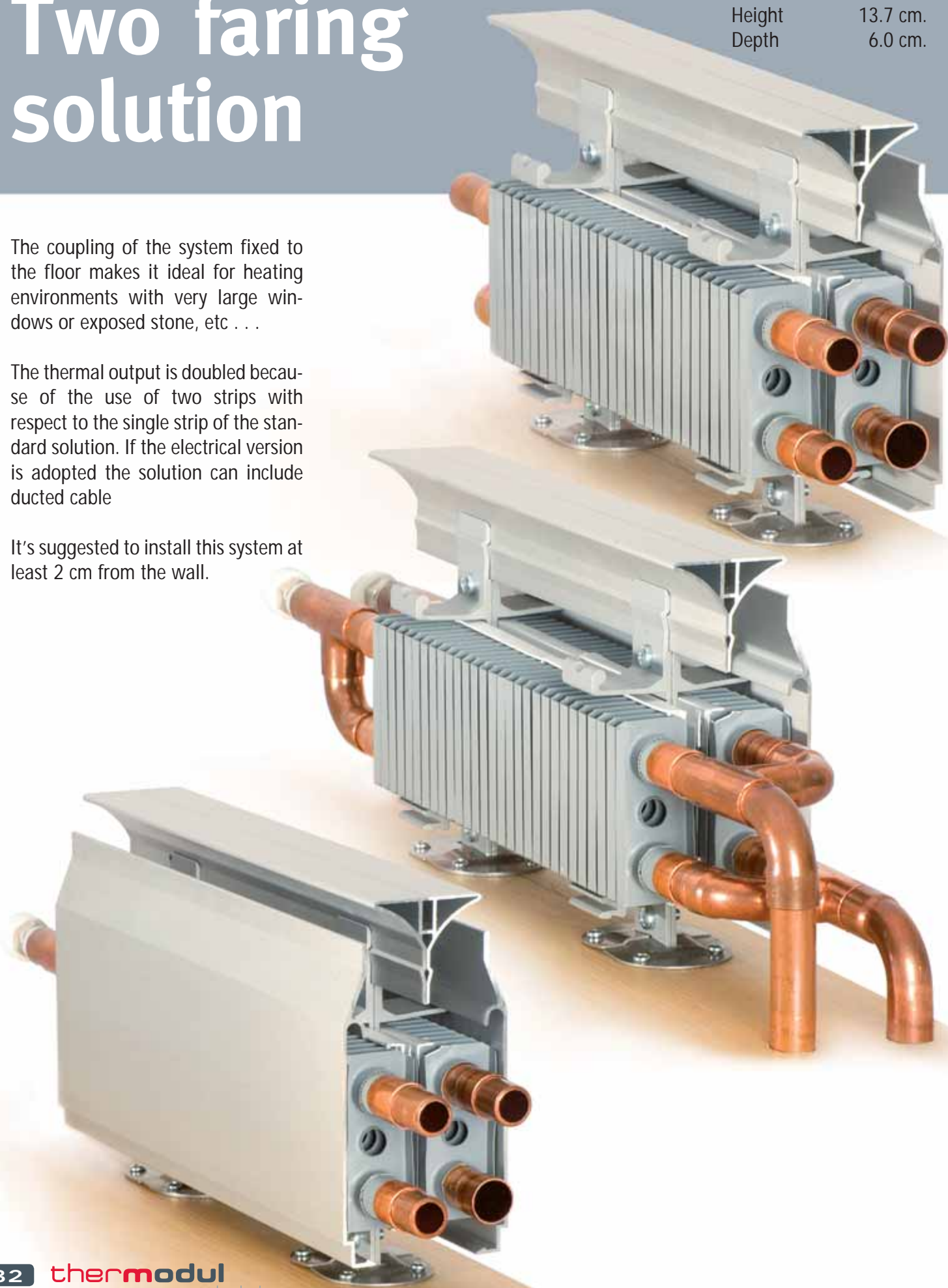
Example of different temperatures between the heating systems

24	23
24	23
19	18
19	18

Traditional System

19	19
19	19
22	22
22	

Floor System

20	20
20	20
20	20
20	20
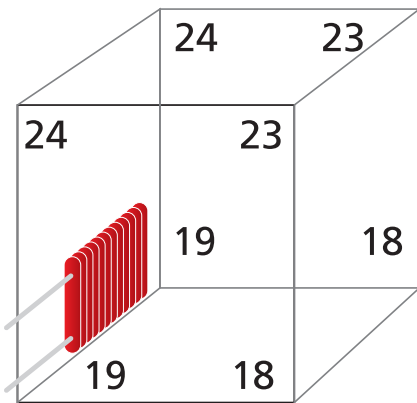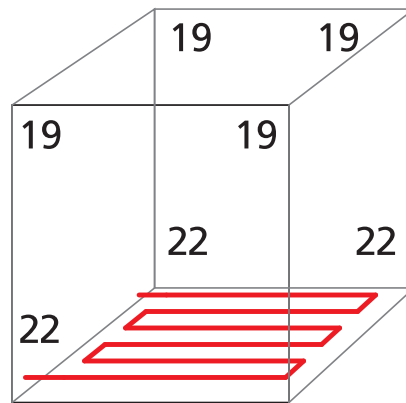
Thermodul System

From the comparison diagrams it is noted that the heat distribution with the skirting board heating system is homogenous from floor to the ceiling.

Behavioural diagram of the heating systems

16° 20° 24° 16° 20° 24° 16° 20° 24° 16° 20° 24° 16° 20° 24°

to hot air   to floor   ideal   to skiring board heater   to radiators
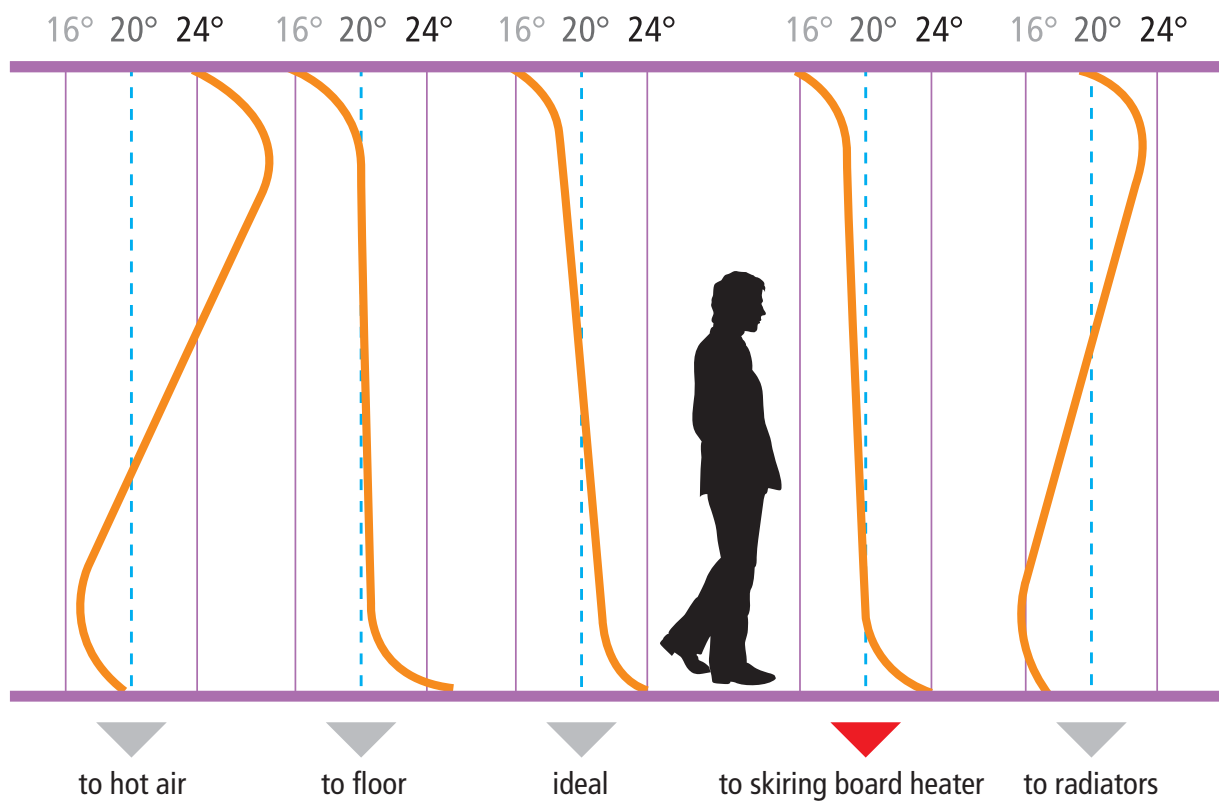
Accurate measurements, the results of which are presented in the above mentioned diagram, demonstrate that the temperature progression with the skirting board heating system is close to the ideal curve.

Hekos' company policy is oriented towards client satisfaction and guarantees that a quality system has been developed which has allowed it to obtain UNI EN ISO 9001:2008 certification

thermodul
by hekos

thermodul

radiant skirting board heating systems **by hekos**

depol ç comelfo

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